CLAIMS

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1. A rotating electric machine comprising a stator with windings (6) drawn through slots (5) in the stator (1), characterized in that at least one winding (6) comprises an insulation system comprising at least two semiconducting layers (32, 34), each layer essentially constituting an equipotential surface, and also including solid insulation (33) between these layers (32, 34) and in that support members (13, 113, 212, 213) are arranged along and in contact with the winding (6).

2. A machine as claimed in claim 1, in which at least one of said layers (32, 34) has substantially the same coefficient of thermal expansion as the solid insulation (33).

3. A machine as claimed in claim 1 or claim 2, the stator winding of which comprises high-voltage cables (6) wherein each lead-through of the cable through a slot (5) is in the following designated a cable lead-through , members (13, 113) being arranged for resilient fixation of each cable lead-through in each slot (5), said members (13, 113) comprising means exerting pressure against each cable lead-through , said pressure means arranged between the cable lead-through and at least one side wall of the slot (5) and spring means arranged between the cable lead-through and at least on side wall of the slot, said pressure means comprising a plurality of elongate pressure elements running in the direction of the cable lead-through.

4. A machine as claimed in claim 3, arranged for direct connection to a power network without intermediate transformers.

5. A machine as claimed in claim 3 or claim 4, wherein each of said pressure elements is in the form of a tube comprising a sleeve containing pressure-hardened material.

6. A machine as claimed in claim 5, wherein said material is epoxy.

7. A machine as claimed in claim 3 or claim 4, wherein each of said pressure elements is in the form of a tube comprising a sleeve containing pressurized fluid.

8. A machine as claimed in any of claims 3-7, wherein at least the majority of said pressure elements exert pressure on two adjacent cable lead-throughs.

9. A machine as claimed in any of claims 3-7, wherein an axial section of said slot exhibits a profile with varying cross section in which each side surface of the slot immediately opposite each cable lead-through has a circular portion corresponding to the outer diameter of the cable and, between these circular portions, has waist parts where the slot width is less, said pressure elements being arranged in said waist parts.

10. A machine as claimed in claim 9, wherein at least some of said waist parts are single-sided waist parts defined by the fact that one slot wall comprises a tangential plane to said circular portions and the part of the other slot wall immediately opposite comprises a connecting plane situated between and substantially parallel to the corresponding tangential plane and a plane connecting the centres of the circular portions, said pressure element being arranged at the slot wall constituting a tangential plane.

11. A machine as claimed in any of claims 3-10, wherein all pressure elements in a slot are arranged at one and the same wall of the slot.

12. A machine as claimed in any of claims 3-11, wherein said pressure members and said resilient members are arranged close to the same slot wall, the resilient members being joined to the pressure members.

13. A machine as claimed in any of claims 3-12, wherein said pressure members and said resilient members are arranged close to different walls of the slot.

~~14. A machine as claimed in claim 13, wherein said resilient member~~ consists of a sheet of elastic material.

15. A machine as claimed in claim 14, wherein said sheet is provided with slots .

16. A machine as claimed in claim 12, wherein said resilient members comprise pads of elastic material applied on the pressure member.

17. A machine as claimed in claim 16, wherein said pads are provided with slots .

18. A machine as claimed in claim 1 or claim 2, wherein the windings (6) consist of high-voltage cable (6), a corrugated sheath (212) surrounding at least some of the cable lead-throughs through the slots.

19. A machine as claimed in claim 18, wherein the corrugated sheath (212) surrounds the cable (6) continuously around its entire circumference and along its entire axial length in the slot (5).

20. A machine as claimed in claim 18 or claim 19, wherein the largest diameter of the corrugated sheath (212) is substantially equal to the width of the slot (5) and wherein the depth (d) of the corrugations is sufficient to absorb thermal expansion of the cable (6) during operation.

21. A machine as claimed in any of claims 18-20, wherein the corrugated sheath (212) is formed from a deformable preferably elastically deformable material.

22. A machine as claimed in any of claims 18-21, in which a casting compound (215) is arranged between the corrugated sheath (212) and the slot.

23. A machine as claimed in any of claims 18-22, wherein the corrugated sheath (212) is formed from a separate tubular corrugated sheath applied around ~~the outer semiconductor layer (34) of the cable.~~

~~24. A machine as claimed in claim 23, wherein the corrugations (212) are~~ annular.

25. A machine as claimed in any of claims 18-21, wherein the corrugated sheath surface is formed of corrugations (212a) in the outer semi -conducting layer (34a) of the cable (6).

26. A machine as claimed in claim 25, wherein the corrugations (212a) run in the longitudinal direction of the cable (6).

27. A machine as claimed in claim 1 or claim 2, wherein the windings consist of high-voltage cable (6) and wherein an elongated elastic support element (313) is arranged along and in contact with at least one cable lead-through (6) in at least one of the slots.

28. A machine as claimed in claim 27, wherein the support element (313) extends along the entire axial extension of the stator.

29. A machine as claimed in claim 27 or claim 28, wherein the support element (313) constitutes a hose.

30. A machine as claimed in claim 29, wherein the hose (313) encloses a pressure medium (312).

31. A machine as claimed in claim 30, wherein the pressure medium is a fluid.

32. A machine as claimed in claim 31, wherein the hose (313) is sealed at both ends.

33. A machine as claimed in claim 31, wherein the pressure fluid communicates with a pressure source.

34. A machine as claimed in claim 30, wherein the pressure medium (312) ~~consists of an elastic material in solid form.~~

35. A machine as claimed in claim 34, wherein the elastic medium has a cavity running axially through it.

36. A machine as claimed in claim 35, wherein the cavity has non-circular cross- section.

37. A machine as claimed in any of claims 27-36, wherein each slot (5) in a radial plane has a profile with wide (7) and narrow (8) parts alternating in radial direction.

38. A rotating electric machine as claimed in claim 37, wherein the narrow parts (8) are asymmetrical in relation to a central plane running radially through the slot.

39. A rotating electric machine as claimed in claim 38, wherein each narrow part (8) is mirror-inverted in relation to the nearest adjacent narrow part (8) seen in the direction of said radial plane.

40. A rotating electric machine as claimed in any of claims 27-39, wherein each support element (313) abuts two cable lead-throughs (6).

41. A rotating electric machine with magnetic circuit for high voltage in which the magnetic circuit comprises a magnetic core and a winding, characterized in that the winding (6) consists of a cable (6) comprising one or more current-carrying conductors (6), each conductor consisting of a number of strand parts (31), that around each conductor (6) is arranged an inner semiconducting layer (32), around which is arranged an insulating layer of solid insulation (33), around which is arranged an outer semiconducting layer (34) and in that support members (13, 113, 212, 313) are arranged along the windings (6), said support members being arranged along and in contact with the windings (6).

42. A machine as claimed in claim 41, including the features defined for machines as claimed in any of claims 2-40.

43. A method for manufacturing a machine as claimed in ~~claim 1 or claim~~ 41, characterized in that at least one elongated support element is inserted and orientated axially in at least one of the slots.

44. A method as claimed in claim 43, wherein hose-like elements are inserted in the slots and oriented axially, after which the hose-like elements are filled with a pressure medium.

45. A method as claimed in claim 44, wherein the hose-like elements are filled with a curable material which is allowed to harden under pressure.

46. A method as claimed in claim 44, wherein hose-like elements are filled with epoxy.

47. A method as claimed in any of claims 44-46, wherein the hose-like elements are inserted after the cable windings have been applied.

48. A method as claimed in any of claims 44-47, wherein a single hose-like element is inserted so that it extends in several loops to and fro through the slots.

49. A method as claimed in claim 43, wherein the cable is surrounded by a corrugated sheath before it is inserted through the slot.

50. A method as claimed in claim 49, wherein the cable is surrounded by a corrugated sheath surface by applying a separate tubular corrugated sheath around the cable before it is inserted into the slot.

51. A method as claimed in claim 49, wherein the cable is surrounded by a corrugated sheath by applying a separate tubular corrugated sheath in the slot before the cable is inserted into the slot.

52. A method as claimed in claim 50, wherein the sheath is applied on the ~~cable in axial direction and a lubricant is used during application~~.

53. A method as claimed in any of claims 50-52, wherein a casting compound is inserted between the sheath and the walls of the slot.

54. A method as claimed in claim 53, wherein axial cooling tubes are cast in the casting compound.

55. A method as claimed in any of claims 50-54, wherein the sheath applied has annular corrugations.

56. A method as claimed in any of claims 50-54, wherein the sheath applied has corrugations running helically.

57. A method as claimed in claim 49, wherein the cable is surrounded by a corrugated sheath surface, the cable being manufactured such that the outer semi-conducting layer is provided with corrugations .

58. A method as claimed in claim 57, wherein the cable is manufactured such that its corrugations run in longitudinal direction.

59. A method as claimed in claim 57 or claim 58, wherein the outer semi-conducting layer of the cable is extruded.

60. A method as claimed in claim 43, wherein the support element is inserted in axial direction, after the cable has been wound.

61. A method as claimed in claim 60, wherein the support element is inserted into a space formed between at least one cable lead-through(word) and at least one wall of the slot and, during application the support element is caused to assume a state enabling it to pass without obstruction or resistance through the profile formed by said space in an axial cross- section, after which, when it has been inserted and positioned in said space, the support element is caused to expand transversely to the axial direction.

62. A method as claimed in claim 61, wherein the support element comprises a thin-walled elastic hose which is decompressed at insertion and the

thinness and elasticity of which is sufficient for the hose to be deformed without noticeable resistance, thereby allowing passage through said profile of the space.

63. A method as claimed in claim 62, wherein at insertion the support element surrounds an elongated body along the entire length of the hose, said body having a cross-sectional dimension such that a space is formed between the hose and the body, said space being filled with a hardening elastic material when the support element is in place in the slot, so that the hose expands transversely to the axial direction.

64. A method as claimed in claim 63, wherein the elongated body consists of an inner, thin-walled hose which is filled with a pressure medium before said space is filled.

65. A method as claimed in claim 62, wherein the elongated body consists of a rod element, which rod element is removed when the space has been filled and said material has hardened.

66. A method as claimed in claim 65, wherein the rod element has a profile with longitudinal ridges.

67. A method as claimed in claim 61 wherein, prior to insertion, the support element is given a cross-sectional profile with clearance to the cross-sectional profile of said space, thereby allowing passage.

68. A method as claimed in claim 63, wherein at insertion the support element is subjected to axial tensile force to reduce its cross-sectional profile and thereby allow passage, the tensile force being released when the support element is in position, thus achieving said expansion.

69. A method as claimed in either of claims 60-61, wherein the support element consists of a hose which at insertion is caused to assume a forcibly deformed state and which, when the hose is in place, is released from the deformed state.

~~70. A method as claimed in claim 69, wherein the deformed state is~~ achieved by gluing the hose in a deformed state and releasing the adhesive joint when the hose is in place.

71. A method as claimed in claim 69, wherein the deformed state is achieved by the interior of the hose being subjected to negative pressure and the negative pressure being released when the hose is in place.

72. A method as claimed in claim 61, wherein the support element consists of a hose having a cross-sectional profile that is less than the cross-sectional profile of said space and that when the element is in place the hose is filled with a pressure medium.

73. A method as claimed in claim 72, wherein the pressure medium is a cold-setting material.

74. A method as claimed in claim 72, wherein the pressure medium is a gas or a liquid and the hose is sealed at its ends when it has been filled with the pressure medium.

75. A method as claimed in claim 72, wherein the pressure medium is a gas or a liquid and wherein this is supplied so that communication can be maintained between the medium and the pressure source even after the machine is in operation.

76. A method as claimed in claim 72, wherein the pressure medium is a ~~rod-shaped body which is inserted through the hose and expands it.~~

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